

CLAIMS

What is claimed is:

1. A method of producing a packaging substrate comprising:

providing a first precursor having a first backbone and a first ethynyl group;

providing a second precursor having a second backbone and a second ethynyl group;

providing a crosslinker having at least a first and a second reactive group capable of forming a carbon-carbon bond;

applying the first precursor, the second precursor, the crosslinker and a solvent onto a surface to form an electrically insulating layer;

reacting the first ethynyl group with the first reactive group in a first carbon-carbon bond forming reaction and reacting the second ethynyl group with the second reactive group in a second carbon-carbon bond forming reaction, thereby crosslinking the first backbone with the second backbone to form the packaging substrate; and

removing the solvent.
2. The method of claim 1 wherein at least one of the first and second backbones comprises an aryl group.
3. The method of claim 2 wherein the aryl group is conjugated with the first or second ethynyl group.
4. The method of claim 3 wherein the aryl group comprises an arylethynyl.
5. The method of claim 4 wherein the arylethynyl is a phenylethynyl.
6. The method of claim 1 wherein the backbone comprises an indane.
7. The method of claim 6 wherein the indane is 1,1,3-trimethyl-3-phenylindane.
8. The method of claim 1 wherein the backbone comprises an oligomer.
9. The method of claim 8 wherein the oligomer comprises an oligo-(1,1,3-trimethylindane).

10. The method of claim 1 wherein at least one of the first and the second backbones further comprises an adhesion enhancer.
11. The method of claim 10 wherein the adhesion enhancer comprises a silane or siloxane group.
12. The method of claim 11 wherein the silane or siloxane group is selected from the group consisting of a vinyltriethoxy silane, a vinyltrimethoxy silane, a vinylmethyldimethoxy silane, a γ -methacryloxypropyltrimethoxy silane, a vinyltriacetoxysilane, a vinyl terminated siloxane, and a polysiloxane.
13. The method of claim 1 wherein the surface comprises an organic fiber.
14. The method of claim 1 wherein the surface comprises a glass fiber.
15. The method of claim 1 wherein the first and second carbon-carbon bond forming reaction is a Diels-Alder reaction, a 4+2 cycloaddition, or a 2+2 cycloaddition.
16. The method of claim 1 wherein the first and second carbon-carbon bond forming reaction is a free radical reaction.
17. The method of claim 1 wherein the first and second carbon-carbon bond forming reaction is an Ene-reaction, a Glaser coupling, or a Straus coupling.
18. The method of claim 1 wherein the first precursor is covalently bound via a bridging group to the second precursor.
19. The method of claim 18 wherein the bridging group is an ethylene, an acetylene, a divinyl benzene, or a diisopropenylbenzene.
20. The method of claim 18 wherein the first or second precursor comprises an indane.
21. The method of claim 18 wherein the backbone of the first or second backbone comprises a bromine.
22. The method of claim 18 wherein the first or second precursor comprises an adhesion enhancer.

23. The method of claim 1, further comprising:

providing a toughener; and

wherein the step of applying further comprises applying the toughener together with the first and second precursor, and the crosslinker onto a surface to form an electrically insulating layer.

24. The method of claim 21 wherein the backbone comprises a phenylethynyl group.

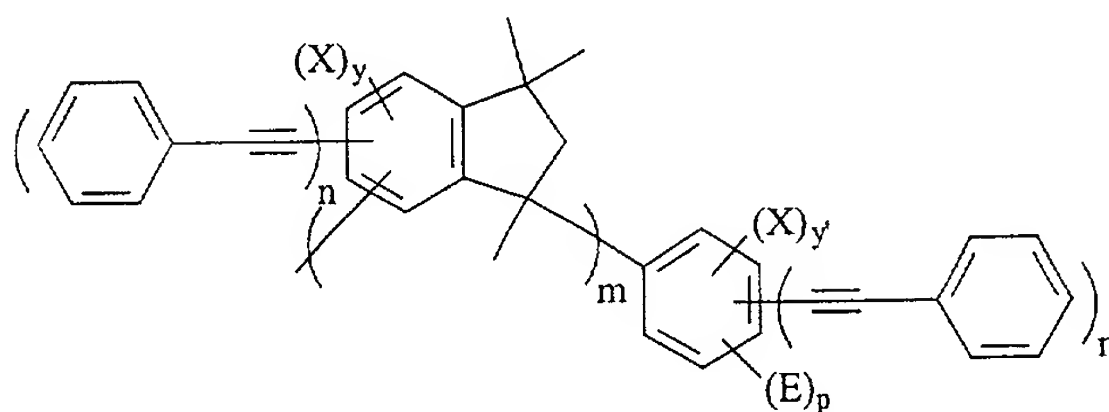
25. The method of claim 21 wherein the backbone comprises an indane.

26. The method of claim 21 wherein the backbone comprises a bromine atom.

27. The method of claim 21 wherein the backbone comprises an adhesion enhancer.

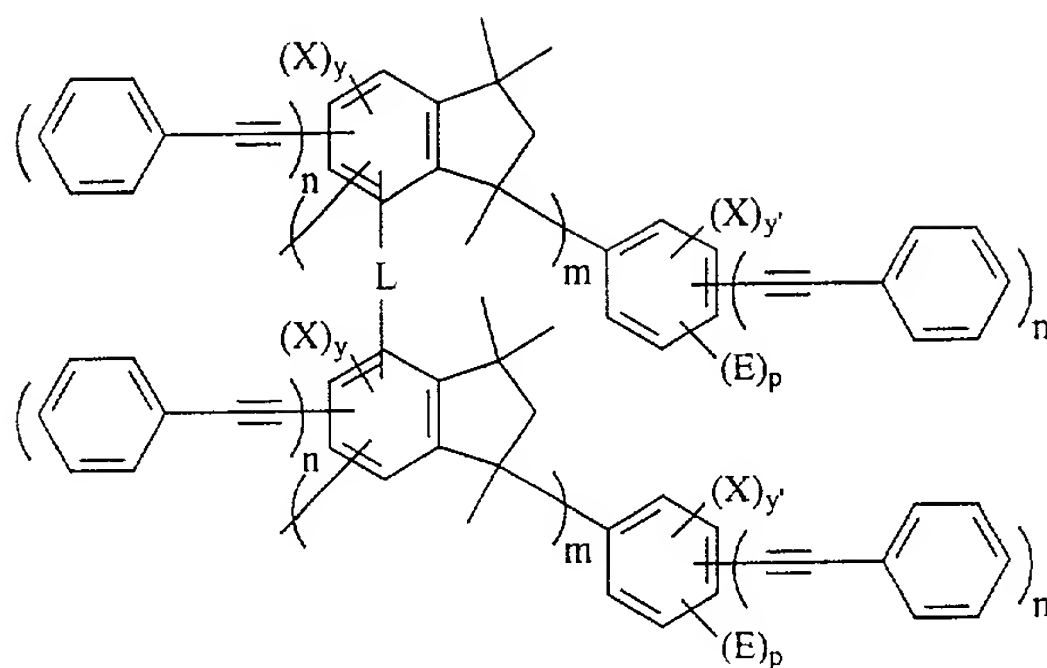
28. The method according to any of claims 1, 16, or 25 wherein the crosslinker is selected from the group consisting of a bismaleimide/allylbisphenol, a benzocyclobutane, a bifunctional vinyl aromatic, a trifunctional vinyl aromatic, a multifunctional vinyl aromatic, and a strained cyclic aliphatic.

29. A precursor of the formula:



wherein X is a halogen, E is an silane or siloxane, $n=1-4$, $y=0-3$, $y'=0-3$ whereby $y+y'>0$, $m=1-10$, and $p=0-3$.

30. A precursor of the formula:



wherein X is a halogen, E is an silane or siloxane, L is an ethynyl, ethenyl, or a divinyl compound, $n=1-4$, $y=0-3$, $y'=0-3$ whereby $y+y'>0$, $m=1-10$, and $p=0-3$.

31. A flame retardant packaging substrate comprising:

a first backbone comprising a brominated indane;

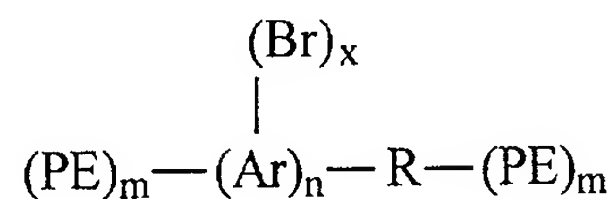
a second backbone comprising a brominated indane;

a crosslinker covalently bound with a first bond to the first backbone and covalently bound with a second bond to the second backbone, wherein the first and the second bond are carbon-carbon bonds, respectively; and

wherein the first and second bond are formed between a reactive group of the crosslinker capable of formation of a carbon-carbon group, and an ethynyl group of the first and second backbone, respectively; and

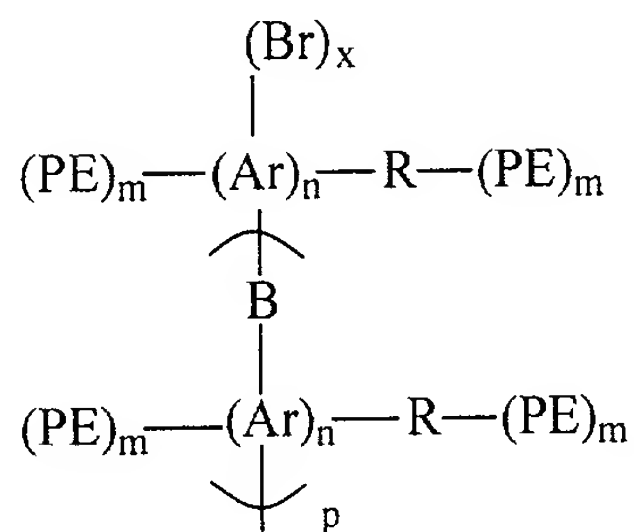
a reinforcing dielectric material.

32. A brominated substituted indane having the structure:



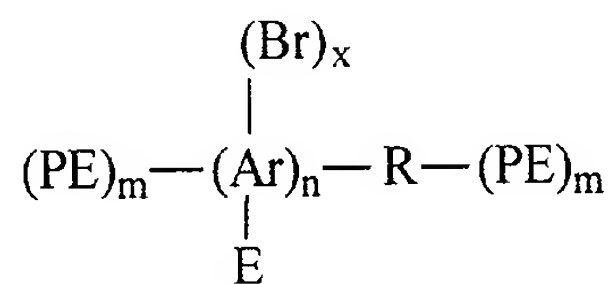
wherein PE is a phenylethynyl, Ar is an indane, R is a phenyl, $n = 1-20$, $x = 1-3$, and $m = 1-4$.

33. A brominated substituted indane having the structure:



wherein PE is a phenylethynyl, Ar is an indane, R is a phenyl, B is a bridging group, $n=1-10$, $x=1-3$, $p=1-20$, and $m=1-4$.

34. A brominated substituted indane having the structure:



wherein PE is a phenylethynyl, Ar is an indane, R is a phenyl, E is an adhesion enhancer, $n=1-20$, $x = 1-3$, and $m = 1-4$.